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中国串珠藻属（红藻门）的两个新种*

施之新
（中国科学院水生生物研究所，武汉 430072）

TWO NEW SPECIES OF THE GENUS *BATRACHOSPERMUM* (RHODOPHYTA) IN CHINA

Shi Zhi-xin
(*Institute of Hydrobiology, Academia Sinica*, Wuhan 430072)

Abstract This paper describes two new species of freshwater red algae, *Batrachospermum* Roth. They belong to the section *Contorta* on the basis of their morphological characters. *B. curvatum*, collected from Hubei Province, is similar to *B. tortuosum* Kumano, but differs from the latter in shape of whorls, terminal hairs and trichogyne. *B. torsivum*, collected from Jiangxi Province, resembles *B. hirosei* Ratnasabapathy et Kumano, but differs from the latter in shape and size of whorls, axial cells, cells of the nodal and internodal filaments, carpogonial branches and trichogyne.

Key words *Batrachospermum curvatum*; *B. torsivum*; Rhodophyta

摘要 本文纪录了淡水红藻串珠藻属 *Batrachospermum* 的二个新种。它们采自中国的亚热地区，按其形态特征，它们属于旋转组 Section *Contorta*。采自湖北省的弯形串珠藻 *B. curvatum* 与扭曲串珠藻 *B. tortuosum* Kumano 相似，但按其轮节、顶毛和受精丝等的形态与后者相区别。采自江西省的弯转串珠藻 *B. torsivum* 与赫罗西串珠藻 *B. hirosei* Ratnasabapathy et Kumano 相似，但轮节、中轴细胞、节丝和节间丝、果胞枝和受精丝等的大小和形态与后者相区别。

关键词 弯形串珠藻；弯转串珠藻；红藻门

1. Batrachospermum curvatum Shi, sp. nov. Fig. 1, 2

Frons monoica, caespitosa, 2—4 cm alta, mucosa, violaceo-viridis, dense irregulariterque ramosissima. Verticilli conspicui, plus pyriformes vel obconici, minus elliptici, vulgo inter se confertim contigui, 250—400 μm crassi. Cellulae axiales cylindricae, in medio leviter constrictae, 50—130 μm latae, 260—550 μm longae; fila corticalia bene evoluta. Fila nodorum (ramuli primarii) dichotome ramosa, 6—10 cellulas longa; cellulis inferioribus majoribus, obovatis, 8—13 μm latis, 18—25 μm longis; cellulis superioribus minoribus, ellipt-

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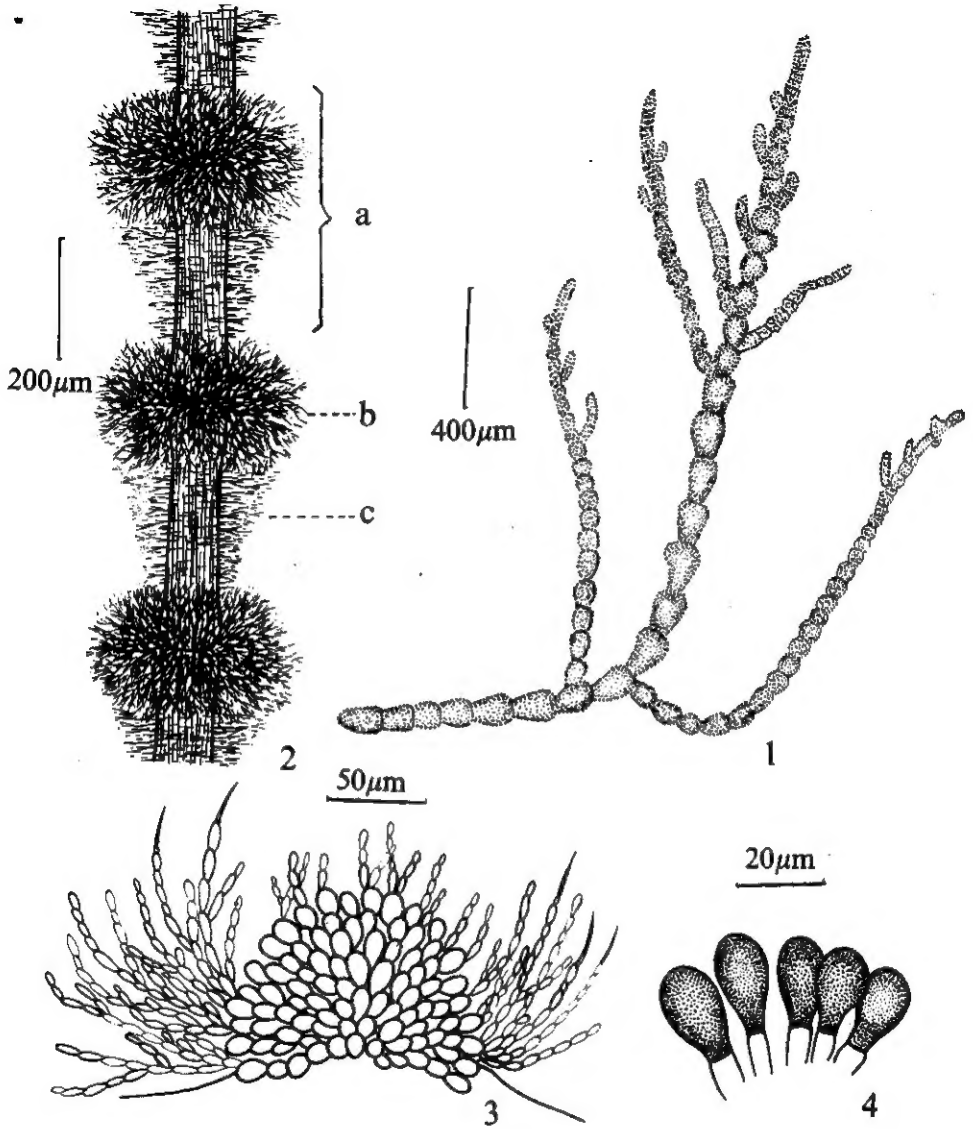

Fig. 1 *Batrachospermum curvatum* Shi
1. A part of the frond; 2. Axial cells and whorls, a. whorl, b. nodal filaments, c. internodal filaments; 3. Gonimoblasts; 4. Carposporangia.

icis vel subrotundis, 6—10 μm latis, 10—15 μm longis. Fila internodiorum (ramuli secundarii) numerosa, totum internodium confertim tegentia, haud ramosa vel dichotome ramosa, 5-vel 6-cellularia; cellulis 4—7.5 μm latis, 9—20 μm longis. Pili numerosi, 20—175 μm longi. Antheridia globosa, 4.5—6.5 μm diametro, in apice filorum nodorum et internodiorum posita. Ramuli carpogoniferi conspicue curvati, e cellulis basium filorum nodorum orientes, 20—40 μm longi, e cellulis 5—7 disciformibus vel doliiformibus compositi; carpogonium basi 6.2—7.5 μm latum; trichogyne breviter pedicellata, anguste elliptica vel anguste ovata, in collum vulgo angustata ad extremitatem, 6.5—9 μm lata, 25—32 μm lon-

ga. Gonimoblasti singuli, interdum duo, semiglobosi vel subglobosi, in centro verticilli inserti, 63—175 μm lati, 60—160 μm alti. Carposporangia obovoidea vel ellipsoidalia, 10—14 μm lata, 13—18 μm longa.

Hab. in scaturigine perlaria (Zhenzhuquan) ad Yuquansi in Dangyang Xian, Hubei; aquae temperatura 20.7 C, pH6; Jun. 15, 1981; Shi Zhi-xin.

Typus in HP7138.

Batrachospermum curvatum sine dubio ad sectionem *Contortam* pertinens ramulis carpogoniferis conspicue curvatis ad *B. tortuosum* Kumano accedens, sed differt a *B. tortuoso* Kumano verticillis pyriformibus vel obovatis; pilo numerosis; trichogyne conspicue breviter pedicellata, anguste elliptica vel anguste ovata, in collum vulgo antice angustata, unflexa ad basim, etc.

Remuli carpogoniferi speciei novae e cellulis basium filorum nudorum initio orientes,

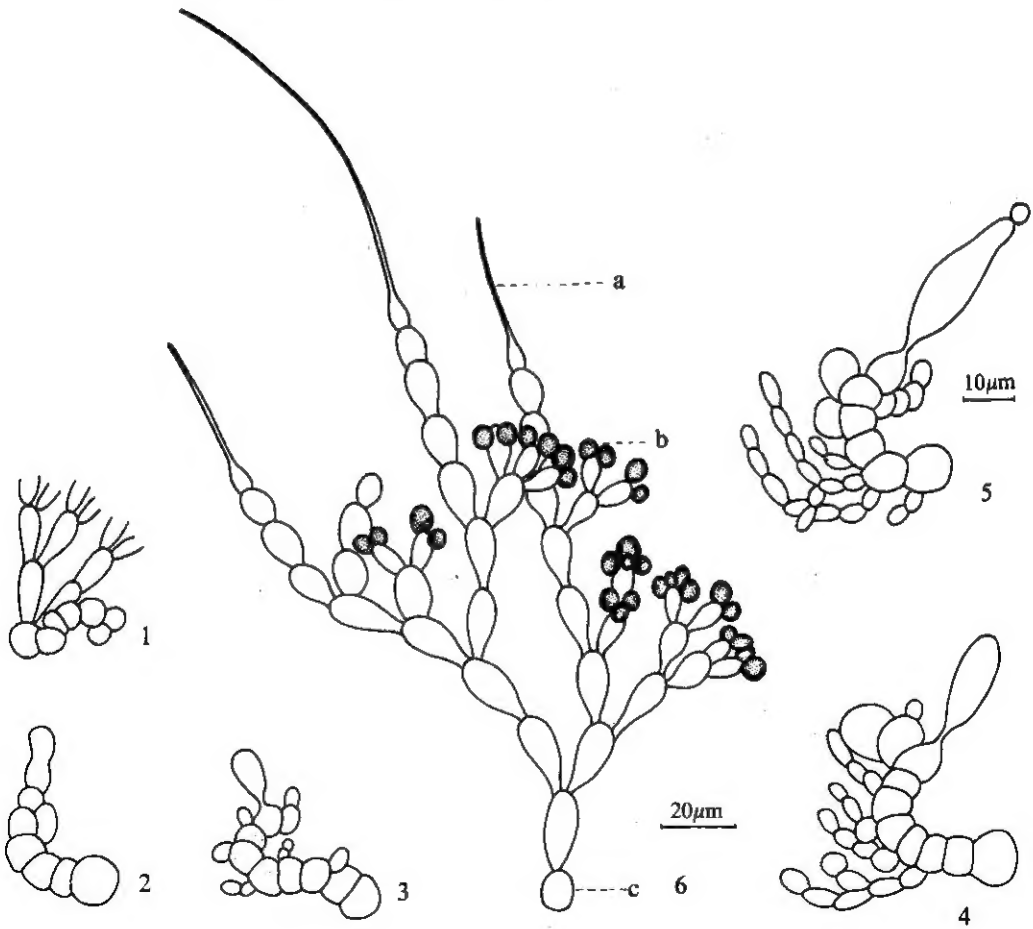

Fig. 2. *Batrachospermum curvatum* Shi

1. Young carpogonial branch with cells undifferentiated at the earlier stage; 2, 3. Young carpogonial branches with unmature carpogonium; 4, 5. Mature carpogonial branches; 6. Nodal filament with antherdia, a. terminal hair, b. antherdia, c. basal cell.

paulo curvi, cellulis undifferentibus (Fig. 2: 1), tum cellula terminatrica ramulorum curvorum in carpogonium gradatim tumide extenseque transiens (Fig. 2: 2), trichogyne sub juventute obovata vel ablonga (Fig. 2: 3), sub maturitate anguste elliptica vel anguste ovata et in collum antice vulgo angustata (Fig. 2: 4, 5).

The new species is similar to *B. tortuosum* Kumano in curved carpogonical branches, but differs from the latter in whorls pear-shaped or obconical (vs. globose or elliptical in the latter), terminal hairs numerous and longer (vs. rare in the latter), trichogyne narrowly elliptical or narrowly ovoidal, with a short stalk and with its anterior end usually attenuate

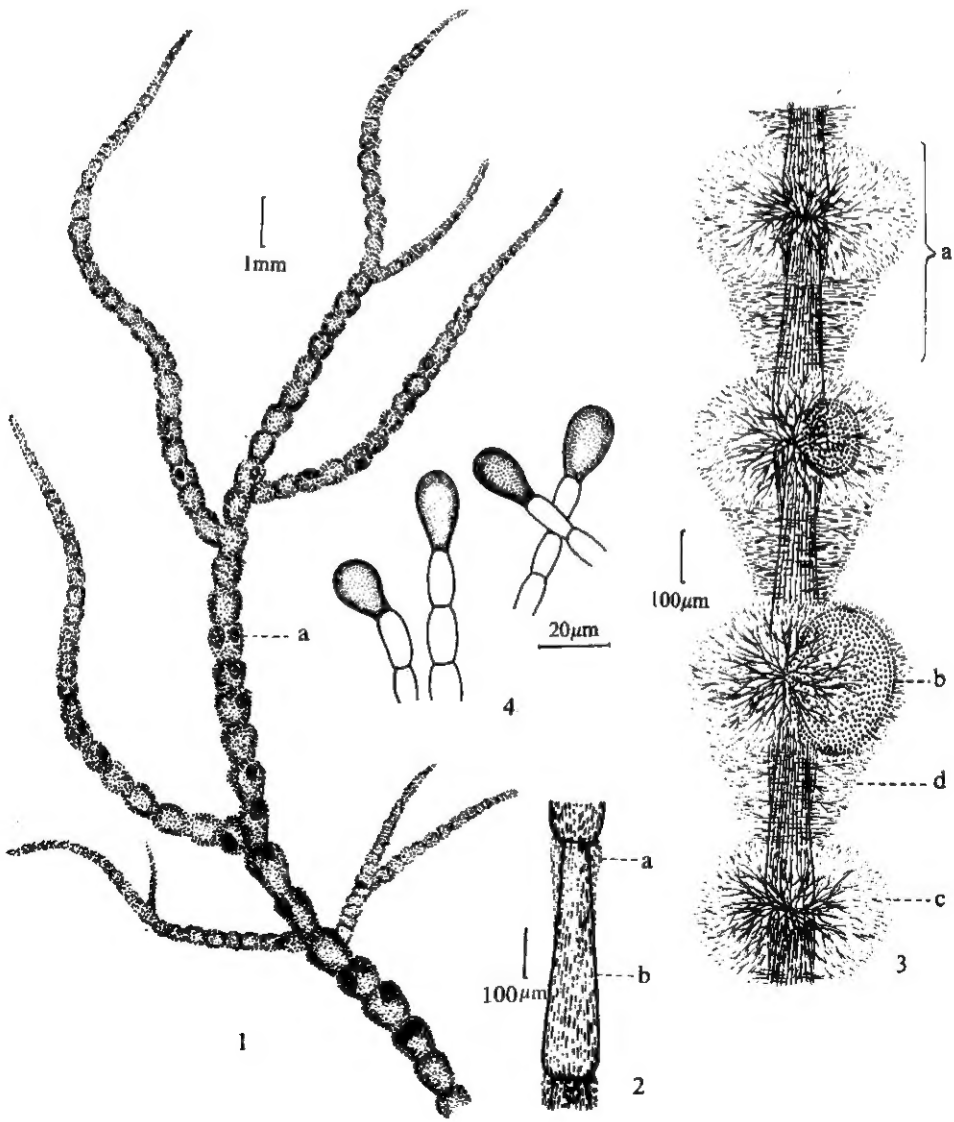

Fig. 3 *Batrachospermum torsivum* Shi

1. A part of frond, a. gonimoblasts; 2. Axial cells and corteces, a. cortex, b. axial cell; 3. Axial cells, whorls and gonimoblasts, a. whorl, b. gonimoblasts, c. nodal filaments, d. internodal filaments; 4. Carposporangia.

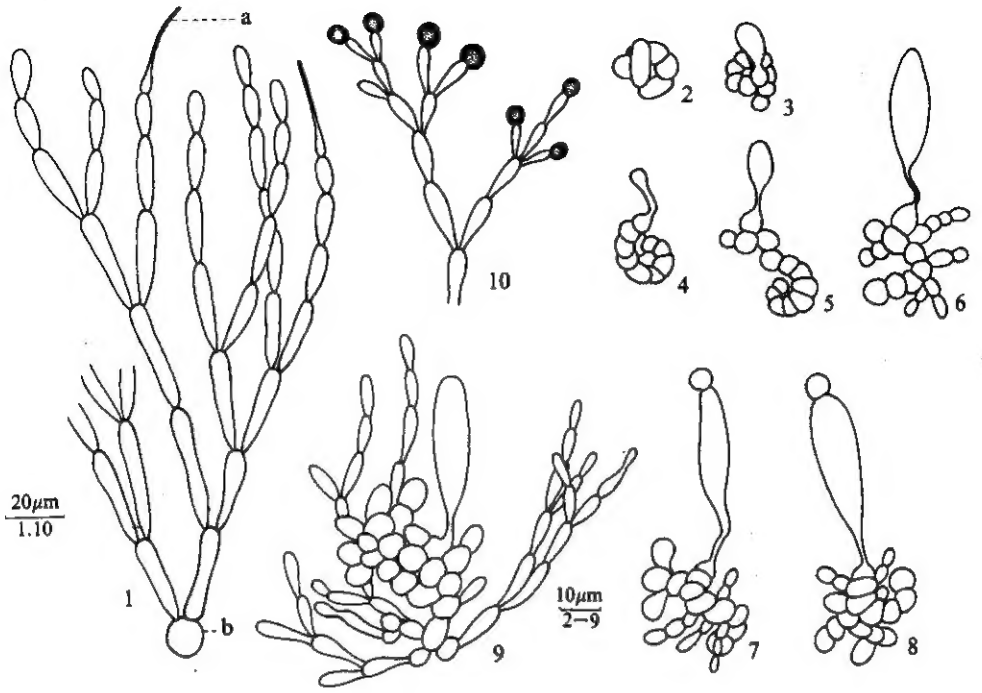

Fig. 4 *Batrachospermum torsivum* Shi

1. Nodal filaments, a. terminal hair, b. basal cell; 2. Young carpogonial branch with cells undifferentiated at the earlier stage; 3—5. Young carpogonial branches with unmature carpogonium; 6—9. mature carpogonial branches; 10. Internodal filaments with antherdia.

and neck-shaped (vs. cylindrical and curved at the basis and without a stalk in the latter), etc.

The developmental process of the carpogonial branch in this species is as follows: a slightly curved small branch with cells undifferentiated at the early stage arises from the basal cell of a nodal filament (Fig. 2: 1), the terminal cell in the small branch then swells out and elongates into carpogonium (Fig. 2: 2), the carpogonial trichogyne is obovoidal or oblong when young (Fig. 2: 3), but becomes narrrowly elliptical or narrowly ovoidal with its anterior end usually narrowing into neck-shaped when fully grown (Fig. 2: 4, 5)

2. **Batrachospermum torsivum** Shi, sp. nov.　Fig. 3, 4

Frons monoica, 2.5—5 cm alta, olivacea, irregulariter ramosa. Verticilli plus obconici, minus pyriformes, in parte juveni frondis subglobosi, inter se confertim contigui, 300—650 μm crassi. Cellulae axiales cylindricae, superne paulo angustae, inferne paulo latae, 40—140 μm latae, 150—750 μm longae; corticibus conspicuis, in parte superna cellulae axialae crassis, in parte inferna cellulae axialae tenuibus. Fila nodorum (ramuli primarii) dichotome ramosa, 7—9 cellulas longa; cellulis inferioribus cylindricis vel longe obconicis, 6.5—7.5 μm latis, 28—38 μm longis; cellulis superioribus ellipticis vel obovoideis, 5—7.5 μm latis, 11—25 μm longis. Fila internodiorum (ramuli secundarii) velde numerosa, totum internodi-

um confertim tegentia, haud ramosa vel dichotome ramosa, 5—8 cellulas longa; cellulis 4—6. 5 μm latis, 12—30 μm longis. Pili pauci et breves, tantum 13—28 μm longi. Antheridia globosa, in filis nodorum et internodiorum terminantia, 4. 5—6. 5 μm diametro. Ramuli carpogoniferi curvati vel torsivi, e cellulis basium filorum nodorum orientes, 30—35 μm longi, e cellulis 5—8 disciformibus vel doliiformibus compositi; carpogonium basi 5—6 μm latum; trichogyne plus cylindrico-claviformis, minus anguste fusiformis vel anguste lanceolata 8—12 μm lata, 28—36 μm longa, cum pedicello conspicue longo et interdum torto et 5—9 μm longo. Gonimoblasti singuli, semiglobosi vel subglobosi, in centro verticilli inserti, 150—340 μm lati, 130—240 μm alti. Carposporangia obovoidea, 8—13 μm lata, 15—23 μm longa. Hab. ad parietes puteorum in Ruijin Xian, Jiangxi; Dec. 1975; Shi Zhi-xin etc.

Typus in KSI75215.

Species nova ad sectionem *Contortam* pertinens et ad *B. hirosei* Ratnasabapathy et Kumano accedens, sed differt a *B. hirosei* verticillis latis; cellulis axialibus majoribus; in filis nodorum et internodiorum, cellulis inferioribus cylindricis vel longe obconicis, superioribus elliptcis vel obovideis; pilis paucis et brevibus; ramulis carpogoniferis curvatis vel torsivis; trichogyne carpogoniala cylindrico-clavifromi vel anguste lanceolata, cum pedicello conspicue gracili longoque; gonimoblastis majoribus, etc.

Processus evoluto de ramulis carpogoniferis; initio ramuli parvi e cellulis basi filorum nodorum orientes, valde spirales, cellulis undifferentibus (Fig. 4; 2), tum cellula terminatrica ramulorum parvorum in carpogonium gradatim tumide extenseque transiens (Fig. 4; 3, 4); trichogyne elliptica sub juventute (Fig. 4; 5), cylindrico-claviformis vel anguste fusiformis vel anguste lanceolata sub maturitate (Fig. 4; 6—9).

This new species resembles *B. hirosei* Rathnasabapathy et Kumano, but distinctly differs from the latter in whorls wider, axial cells larger, the cells of the nodal and internodal filaments cylindrical or long-obconic in the lower part and elliptical or obovoidal in the upper part (vs. fusiform in the latter), terminal hairs rare (vs. none in the latter), carpogonial branches curved or twisted (vs. strongly twisted in the latter), the trichogyne cylindrically claviform or narrowly fusiform or narrowly lanceolate with a slender and long stalk (vs. elliptical or irregularly spatulate and with a short stalk in the latter), gonimoblasts larger, etc.

The developmental process of the carpogonial branch in this species is as follows: a strongly twisted small branch with cells undifferentiated at the early. stage arises from the basal cell of a nodal filament (Fig. 4; 2) the terminal cell in the small branch then swells out and elongates into a carpogonium (Fig. 4; 3, 4), the trichogyne is elliptical when young (Fig. 4; 5) but becomes cylindrically claviform or narrowly elliptical or narrowly lanceolate when well-devoloped (Fig. 6—9).

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